

ROOT SUCKERS ON DOUGLAS FIR.

THE occurrence of stool shoots among deciduous species of trees is very common, and their production by the forester is resorted to for the reproduction of many species. Among conifers the formation of stool shoots is limited to a few species. The California redwood (*Sequoia sempervirens*) is very commonly reproduced in this way. Much less common than stool shoots are root shoots, often known as root suckers or suckers. Among conifers only the redwood, the California nutmeg (*Tumion Californica*), and the short-leaf or yellow pine (*Pinus echinata* Miller) have so far been reported as producing root suckers.

For several years the woodsmen of western Washington have recognized in the fir forests a curious growth which they have called "sap suckers." As we see them in the forest they appear as a broken stub ranging in height from 0.6 to 3.5^m. Without leaves or branches, they appear entirely lifeless until cut into with an axe. An examination shows that they are covered with living bark and beneath that a living woody tissue very hard and with a grain of very fine and intricate burl.

The sap suckers vary greatly in size and external appearance. The diameters range from 30 to 60^{cm} and the height from 0.6 to 3.5^m. Investigation has shown that they are connected with one of the main roots of the parent fir, their distance from the parent trunk varying from 0.6 to 4.5^m, an average distance being about 1.8^m. The living bark bears little resemblance to the bark of the fir except in color. The clefts are much finer and the plates much smaller. The living wood, in every instance, forms only an enveloping sheath about a decaying stub. It varies in thickness from 12 to 50^{mm} and there is great diversity in the disposition of this living sheath. It begins at or below the surface of the ground and grows upward, entirely encircling the decaying core. In many cases where the stub was very short the wood burl entirely covered it over, forming sometimes a low globular protuberance about 0.6^m high and sometimes a column 3.5^m high; but in the great majority of cases the burl covering has extended to only a portion of the height of the stub, so that the rotting dead end still protrudes above.

The "sap sucker" is only a secondary growth on an ordinary root sucker. The formation of these on the roots of the Douglas fir, *Pseudotsuga taxifolia*, was proven by examination. In the dense woods of

this region it is hard to distinguish the suckers from ordinary seedlings. Like most seedlings, those of the fir are very weak, and when they reach a maximum diameter of about 25^{mm} they die and begin to decay. At this time the formation of the secondary burl covering begins. The nourishment before given the sucker is utilized in covering over the dead and decaying stub with this new live growth.

In one instance a dead sucker had been covered with a primary burl covering to a height of 1.5^m. This had died, the bark had fallen off, and a second burl covering, still alive, had covered this over to a height of 0.9^m.

These suckers are found only in the moistest and densest forests. Even under the proper conditions they are very rare. They were observed in the summer of 1898, ten to fifteen miles from tide water, Chehalis county, Washington.—FRANK HAINES LAMB, *Biltmore, N. C.*